US-PAT-NO: 6323934

DOCUMENT-IDENTIFIER: US 6323934 B1
See image for Certificate of Correction

TITLE: Image processing method and apparatus

DATE-ISSUED: November 27, 2001

US-CL-CURRENT: 355/40, 355/32 , 355/38 , 355/52 , 358/487 , 358/506 , 382/298 , 382/299 , 382/300

APPL-NO: 09/ 205292

DATE FILED: December 4, 1998

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	9-333943	December 4, 1997
JP	9-338511	December 9, 1997
JP	10-040177	February 23, 1998
JP	10-059454	March 11, 1998

---------- KWIC ---------

Detailed Description Text - DETX (24):
The image processing steps to be performed in the image processing block 50A of the processing subsection 50 and the image

processing block 54A of the processing subsection 54 may be exemplified by, for example, color balance adjustment, contrast correction (gradation adjustment), brightness correction, dodging (compression/expansion of the density's **dynamic range**), saturation correction and sharpening. These steps may be performed by any known methods comprising suitable combinations of arithmetic operations, processing with a LUT (lookup table), matrix (MTX) operations, filtering and so forth; in the illustrated case, color balance adjustment, brightness correction and contrast correction are performed with LUTs and saturation correction with MTX. Sharpening, dodging and other steps are performed in the image processing blocks 50A and 54B in response to an operator's command, or in accordance with the image data to be processed and so forth.

Claims Text - CLTX (35):

15. The apparatus according to claim 11, wherein said correcting means calculates corrected image positions for the lateral chromatic **aberration of a reference color** for three primaries to correct the lateral chromatic aberration of the image, or, calculates corrected image positions for the distortion of the three primaries to correct the distortion of the image, or calculates corrected image positions for the lateral chromatic aberration and distortion of the three primaries for other colors of the image to correct the lateral chromatic aberration and distortion of the image.

US-PAT-NO: 6181819

DOCUMENT-IDENTIFIER: US 6181819 B1
See image for Certificate of Correction

TITLE: Image processing apparatus including means for judging a chromatic portion of an image

DATE-ISSUED: January 30, 2001

US-CL-CURRENT: 382/181, 358/462

APPL-NO: 08/ 426628

DATE FILED: April 21, 1995

PARENT-CASE:

This application is a continuation of application Ser. No. 08/085,176 filed Jul. 2, 1993, now abandoned, which was a division of application Ser. No. 08/002,679 filed Jan. 8, 1993, now U.S. Pat. No. 5,251,023, issued Oct. 5, 1993, which was a continuation of application Ser. No. 07/561,292 filed Aug. 2, 1990, now abandoned.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	1-199343	August 2, 1989
JP	1-200471	August 2, 1989
JP	1-200472	August 2, 1989

JP 1-200473 August
2, 1989
JP 1-200474 August
2, 1989
JP 1-200475 August
2, 1989
JP 1-200476 August
2, 1989
JP 1-200499 August
2, 1989

---------- KWIC ---------

Brief Summary Text - BSTX (29):
For this reason, there has been proposed a method of preventing the
generation of **color blurs (color bleeding) in colors** round black character
areas.

Drawing Description Text - DRTX (11):
FIGS. 9 and 10 are views showing a state of **color bleeding**;

Detailed Description Text - DETX (71):
In this embodiment, the judgement as to whether a given pixel is colored or
color-free is carried out in the above algorithm in order to remove **color
bleeding at color** change points in original due to scanning irregularities in
optical scanning systems 206 to 208 and magnification error in optical
image-focusing system 209. If neither black pixels nor colored pixels are
present in excess of a predetermined number around

UNK3 signal, gates 1713 to 1715 detect it and provide UNK signal, representing intermediate status between colored and color-free.

Detailed Description Text - DETX (73):

In the logic circuit for BL signal generation shown in FIG. 7, if a given pixel is a black pixel, BL signal is provided irrespective of the surrounding status. However, if there is scanning speed irregularity or focusing magnification error as noted above, a black signal (Bk) is liable to be generated due to **color bleeding around color** signal (C) as shown in FIG. 9. The black signal (Bk) due to this **color bleeding** (C) is generated around the color signal as shown in FIG. 10, thus increasing the light amount compared to the color signal. Accordingly, the CAN signal generator shown in FIG. 17-1 generates a CAN signal by checking whether a color signal (COL) of a lower light amount than a given pixel is present around the given pixel.

Detailed Description Text - DETX (77):

More specifically, if pixels neighboring a given pixel are lower than the level of the given pixel and have color component, it is decided that there is **color bleeding** as shown in FIGS. 9 and 10, and the CAN signal is generated.

Detailed Description Text - DETX (142):

for removal of background **color and color**

bleeding of developing material in printer 202.

Detailed Description Text - DETX (143):

In the above equation, a.sub.11 to a.sub.14, a.sub.21 to a.sub.24, a.sub.31 to a.sub.34 and a.sub.41 to a.sub.44 are masking coefficients for removal of **bleeding of predetermined colors**, and u.sub.1, u.sub.2 and u.sub.3 are UCR coefficients for removing K component from M, C and Y components. M', C', Y' and K' are selected one by one according to 2-bit developing color signal PHASE from control unit 4-1 to be provided as Vl signal. M', C', Y' and K' are selected in correspondence to 0, 1, 2, 3 of PHASE signal.

Detailed Description Text - DETX (183):

D/A converter 3701 converts VIDEO signal into analog image signal AV, and toggle flip-flops 3702 and 3803 subject image signal CLK synchronized to VIDEO signal and screen clock CLK4 at double the frequency to HSYNC synchronization and frequency division to 1/2 to obtain clocks CLK4F and CLKF with duty ratio of 50%. These two clocks are deformed by integrators 3704 and 3705 into triangular waves, which are then peak regulated by amplifiers 3706 and 3707 into the output **dynamic range** of A/D covnerter for comparison with AV signal in analog comparators 3708 and 3709. Consequently, AV signal is converted into two pulse width modulation signals PW4 and PW. Subsequently, selector 3710

either PW4 or PW according to DSCR signal to provide laser drive signal LDR.

Detailed Description Text - DETX (264):
It has been described in connection with the first embodiment that intermediate saturation judgement signal UNK and black judgement signal BL are generated due to **color bleeding** around colored character due to scanning speed fluctuations and focusing magnification errors.

Detailed Description Text - DETX (266):
Therefore, if UNK or BL signal is generated due to erroenous judgement caused by **color bleeding** as noted above, a great amount of black toner is used for colored character edge portions of recorded image, thus resulting in an unseemly image.

Detailed Description Text - DETX (268):
In this case, if the given pixel is of intermediate saturation or in case of black signal, it is determined to be due to **color bleeding** around colored character, thus preventing use of a great quantity of black toner through a process as shown in the table of FIG. 26.

Detailed Description Text - DETX (273):
By using this ND signal as brightness singal, it is possible to generate CAN signal from calculation unit 1722 for **color bleeding** generated around colored characters of all color hues.

Detailed Description Text - DETX (274):
Consequently, as shown in the table of FIG. 2b, intermediate saturation and black judgements generated due to **color bleeding** are all cancelled to eliminate the possibility of use of black toner for areas around colored characters.

Detailed Description Text - DETX (276):
FIG. 56 shows an example, in which **color bleeding when color** disassembly signal is read out covers two pixels. In the Figure, black signal due to color deviation at the time of reading is generated for one pixel in the edge of colored character. Further, intermediate saturation is generated due to slight color deviation around the black signal.

Detailed Description Text - DETX (289):
As described above, with this embodiment it is possible to distinguish **color bleeding** component contained around color edge portion of original and signal of color-free or intermediate saturation.

Detailed Description Text - DETX (291):
Further, particularly with this embodiment a signal obtained by combining R, B and G signals is used for the judgement of character edge portion, and therefore it is possible to effectively prevent black **color bleeding** around a sole green color character, for instance.

US-PAT-NO: 6219158

DOCUMENT-IDENTIFIER: US 6219158 B1

TITLE: Method and apparatus for a dynamically variable scanner, copier or facsimile secondary reflective surface

DATE-ISSUED: April 17, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Dawe; Julie T.	Fort Collins	CO	N/A	N/A

APPL-NO: 09/ 127654

DATE FILED: July 31, 1998

PARENT-CASE:

RELATED APPLICATION

Copending application Ser. No. 09/016,562, entitled Reflector for Document Scanner of Copier, filed Jan. 30, 1998, which is a continuation-in-part of application Ser. No. 08/610,032, filed Mar. 4, 1996.

US-CL-CURRENT: 358/509, 355/75 , 358/474 , 358/475 , 358/486 , 358/488 , 358/505 , 399/379 , 399/380

ABSTRACT:

A reflective surface behind an image to be scanned on an optical image scanner, copier, facsimile machine or similar device. This reflective surface is dynamically adaptive to the item being scanned, copied or faxed to provide improvements such as reducing image bleed-through while maintaining a desirable level of dynamic range. Preferably, the reflective surface has a reflectance that is dynamically variable and controlled to be either all white, all black, all grey or some other color. The scanning or copying reflective background may also be varied in different regions, such that different regions of the reflective background may simultaneously be white, black, grey, or some other color. The background reflective surface of the scanner, facsimile or copier may be controlled directly by an operator or end user or by software or firmware of the scanner, copier or facsimile. The dynamically variable reflective surface of the scanner, facsimile or copier may be an LCD.

9 Claims, 3 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 3

---------- KWIC ---------

Detailed Description Text - DETX (10):

There could be hardware controls for the end user or operator to change the screen color and also software controls. Software

or firmware may be used to
automatically search for **bleed-through and color** shift after a preview scan.
The software or firmware could then change the screen **color if necessary to reduce bleed-through, adjust the total dynamic range, or color** shift problems after the preview scan is analyzed. The software could then initiate the actual scan of the document or perform another preview scan and readjust the screen **color as necessary until the bleed-through, total dynamic range and color** shift are within predetermined limits. The software may also adjust different portions of the dynamic background, so that different portions of the dynamic background or secondary reflective surface 114 are darkened or lightened where appropriate, such as when a magazine page with both text and photographs is being scanned.

US-PAT-NO: 6219158

DOCUMENT-IDENTIFIER: US 6219158 B1

TITLE: Method and apparatus for a dynamically variable scanner, copier or facsimile secondary reflective surface

DATE-ISSUED: April 17, 2001

US-CL-CURRENT: 358/509, 355/75 , 358/474 , 358/475 , 358/486 , 358/488 , 358/505 , 399/379 , 399/380

APPL-NO: 09/ 127654

DATE FILED: July 31, 1998

PARENT-CASE:

RELATED APPLICATION

Copending application Ser. No. 09/016,562, entitled Reflector for Document Scanner of Copier, filed Jan. 30, 1998, which is a continuation-in-part of application Ser. No. 08/610,032, filed Mar. 4, 1996.

---------- KWIC ---------

Detailed Description Text - DETX (10):

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or firmware may be used to automatically search for bleed-through and color shift after a preview scan. The software or firmware could then change the screen **color if necessary to reduce bleed-through, adjust the total dynamic range, or color** shift problems after the preview scan is analyzed. The software could then initiate the actual scan of the document or perform another preview scan and readjust the screen **color as necessary until the bleed-through, total dynamic range and color** shift are within predetermined limits. The software may also adjust different portions of the dynamic background, so that different portions of the dynamic background or secondary reflective surface 114 are darkened or lightened where appropriate, such as when a magazine page with both text and photographs is being scanned.

DERWENT-ACC-NO: 1993-091064

DERWENT-WEEK: 199311

TITLE: High efficiency encoder-decoder for colour image signal decreasing encoding distortion in vision - calculates mean value in block of component containing **chromatic** information in input signal changes by **dynamic range** on input signal NoAbstract

PRIORITY-DATA: 1991JP-0188537 (July 29, 1991)

PATENT-FAMILY:

PUB-NO		PUB-DATE
LANGUAGE	PAGES	MAIN-IPC
JP 05037787 A		February 12, 1993
N/A	010	H04N 001/41

INT-CL (IPC): G06F015/66, H04N001/41 , H04N001/415 , H04N011/04

ABSTRACTED-PUB-NO: JP 05037787A

EQUIVALENT-ABSTRACTS:

---------- KWIC ---------

Title - TIX (1):
High efficiency encoder-decoder for colour

image signal decreasing encoding
distortion in vision - calculates mean value in block of component containing
chromatic information in input signal changes by
dynamic range on input signal
NoAbstract

Standard Title Terms - TTX (1):
HIGH EFFICIENCY ENCODE DECODE COLOUR IMAGE SIGNAL DECREASE ENCODE DISTORT VISION CALCULATE MEAN VALUE BLOCK COMPONENT CONTAIN **CHROMATIC** INFORMATION INPUT SIGNAL CHANGE **DYNAMIC RANGE** INPUT SIGNAL NOABSTRACT

DERWENT-ACC-NO: 1999-344232

DERWENT-WEEK: 199929

TITLE: Signal processing apparatus for video camera - has brightness gain controller that regulates gain level of luminance signal based on correction color signals obtained by comparing color component ratios of correction color signals of every pixel

PRIORITY-DATA: 1997JP-0292748 (October 24, 1997)

PATENT-FAMILY:

PUB-NO		PUB-DATE
LANGUAGE	PAGES	MAIN-IPC
JP 11127442 A		May 11, 1999
N/A	007	H04N 009/04

INT-CL (IPC): H04N009/04, H04N009/73

ABSTRACTED-PUB-NO: JP 11127442A

BASIC-ABSTRACT:

NOVELTY - A brightness gain controller (35) regulates the gain level of a luminance signal based on the correction **color signal obtained by comparing the color component ratios of the integration result of**

correction color signal of
each pixel. DETAILED DESCRIPTION - A white balance controller (33) adjusts the white balance of the color signals based on the integration result of the color signals, and outputs the correction color signals. An integrator (31) combines the color components of the color signals of every pixel for predetermined time, and outputs an integration result. INDEPENDENT CLAIMS are also included for the following:a recording medium for storing control program of camera signal processing apparatus; and a camera signal processing method.

USE - For video camera.

ADVANTAGE - Performs effective white color balance adjustment. Maintains resolution of image corresponding to tracks even when input video suddenly changes. DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of a video camera provided with a signal processing apparatus. (31) Integrator; (33) White balance controller; (35) Brightness gain controller.

---------- KWIC ---------

Basic Abstract Text - ABTX (1):
NOVELTY - A brightness gain controller (35) regulates the gain level of a luminance signal based on the correction **color signal obtained by comparing the color component ratios of the integration result of correction color signal of**

each pixel. DETAILED DESCRIPTION - A white balance controller (33) adjusts the white balance of the color signals based on the integration result of the color signals, and outputs the correction color signals. An integrator (31) combines the color components of the color signals of every pixel for predetermined time, and outputs an integration result. INDEPENDENT CLAIMS are also included for the following:a recording medium for storing control program of camera signal processing apparatus; and a camera signal processing method.

US-PAT-NO: 5218671

DOCUMENT-IDENTIFIER: US 5218671 A

TITLE: Image color correction system and method

DATE-ISSUED: June 8, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Liao; Ho-Long	Rockford	MI	N/A	N/A
Falk; Edward K.	Rockford	MI	N/A	N/A

APPL-NO: 07/ 359118

DATE FILED: May 31, 1989

US-CL-CURRENT: 345/595, 345/428 , 345/600

ABSTRACT:

A system and method for correcting errors in the colors of an image in a computer-aided design system; such errors being introduced by a process such as the production of a hard-copy of an image displayed on a graphic CRT. Tools are provided for the user to select "registered" colors and to determine, either manually or by system calculation, corrected values of such registered colors that will produce the desired image on the hard-copy. The manual selection technique provides tools for iteratively

creating charts of related,
but varied, color squares and sending the charts to the output device. The
resulting hard-copy is compared by the user with the chart displayed on the CRT
and the user's selection is processed by the system. In the other technique,
the hard-copy image of such color chart is re-entered to the system through an
input device and the error between the original and processed color patches is
calculated and applied to determine corrected colors. Once a palette of
registered and corrected colors is developed, it may be applied to correct
images composed of such registered colors or to correct images composed of
virtually any combination of colors. For the latter type of images, color
values in the image that do not correspond to "registered" colors are corrected
by creating a new 3-D color space based upon the existing registered colors and
assigning a corrected value of each color as a result of the "influence" of
adjacent registered colors in the created color space.

27 Claims, 14 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 11

---------- KWIC ---------

Detailed Description Text - DETX (53):
FIG. 14 illustrates the flowchart for interpolating the corrected color.

The system examines (238) each tetrahedron in the new color space to find the one containing the (R, G, B) coordinate of the image pixel to be corrected. Then the distances from this coordinate to each vertex of the tetrahedron and the distances to each plane defined by the other three vertices are calculated (240, 242). The ratio of "influence" of each vertex over the final corrected color is determined (244, 246) proportional to the distances calculated in 240 and 242. Once the **ratios are determined, the corrected color value of this point is calculated (248) by multiplying the ratio of each vertex to the value of its corresponding corrected color** to get its "contribution" to the (R, G, B) components, and adding the contributions from each vertex together to get the final (R, G, B) value of the **corrected color for the pixel**. Finally, the original color of the pixel is replaced by this corrected color in the array and the correction procedures are applied to next pixel until all the pixels in the array are corrected. The array of colors defining the displayed image is replaced with the proper corrected colors.

US-PAT-NO: 5420704

DOCUMENT-IDENTIFIER: US 5420704 A

TITLE: Method and apparatus for the analysis of color casts in color originals

DATE-ISSUED: May 30, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Winkelman; Kurt-Helfried	Kiel	N/A	N/A	DE

APPL-NO: 08/ 306428

DATE FILED: September 19, 1994

PARENT-CASE:

This is a continuation of application Ser. No. 08/043,221, filed Apr. 6, 1993, now abandoned.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
DE	42 11 452.7	April 6, 1992
DE	43 09 877.0	March 26, 1993

US-CL-CURRENT: 358/520, 358/518 , 358/522

ABSTRACT:

A method and apparatus for the analysis of a color cast in a color original to be reproduced, by evaluating color values acquired by point-by-point and line-by-line, trichromatic scanning with an image processing input device. For acquiring a color cast in the color original, a region of high luminance values (light image region) and/or a region of low luminance values (dark image region) of the luminance component L* of the color values L*, a*, b* in the color original to be analyzed is/are subdivided into at least one luminance region. The value of a potentially existing color cast in the luminance region is identified by averaging the color components a*, b* of the color values L*, a*, b* in the luminance region. The color cast value to be utilized for the evaluation of the color cast analysis is formed by selection and/or combination of color cast values identified for individual luminance regions. In addition, at least one luminance region is demarcated to form an analysis region in view of the chrominance c* by forming chrominance regions around the gray axis of the color space, whereby the demarcated analysis region is then utilized for calculating a potential color cast.

20 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 4

---------- KWIC ---------

Brief Summary Text - BSTX (19):

According to the present invention, a method and apparatus is provided for analysis of a color cast in a color original to be reproduced for color image processing. Color values (L*, a*, b*) are acquired by point-by-point and line-by-line, trichromatic scanning of the color original with an image processing input apparatus. A value range of a luminance component (L*) of the color values (L*, a*, b*) is subdivided into luminance regions. The subdividing into luminance regions is undertaken in at least one of a light image region of relatively **high luminance** values and in a dark image region of relatively low luminance values. The luminance regions are additionally demarcated in view of hue by forming hue regions around a gray scale axis of a color space for analysis regions. The demarcated analysis regions are utilized for checking for potentially present color casts. A **minimum plurality of color values** (L*, a*, b*) to be evaluated are defined for identification of the color cast value and an analysis region. Given presence of a color cast in an analysis region, a determination is made as to whether a plurality of color values (L*, a*, b*) available in the analysis region is higher than the minimum plurality. The color cast value of the analysis region is only calculated when the plurality of color values (L*, a*, b*) available is higher than the minimum plurality. A color cast value to be utilized for evaluation of the color cast

analysis is identified by at least one of selection or combination of color
cast values calculated for the individual analysis regions.

US-PAT-NO: 5757975

DOCUMENT-IDENTIFIER: US 5757975 A

TITLE: Artifact reduction for large dynamic range input data in JPEG compression

DATE-ISSUED: May 26, 1998

US-CL-CURRENT: 382/251, 358/463 , 382/275

APPL-NO: 08/ 754582

DATE FILED: November 21, 1996

---------- KWIC ---------

Detailed Description Text - DETX (7):
In the first step of the method, a **pixel outside the dynamic range is detected and on detection, the neighborhood** is examined to reduce the artifact.
The method can best be explained by using a simple example. Assume, for simplicity, an area of 4.times.4 pixels with the following values:

Detailed Description Text - DETX (8):
In this case, the first out-of-range number that is encountered (in standard left-right, top-bottom processing) is the value "-10". This value indicates a noise amplitude of "at least 10 units" at that

location. The algorithm then detects all **neighboring pixels** whose value deviates from the **dynamic range** boundaries by not more than "a" times that noise amplitude, i.e., a pixel is marked if

Detailed Description Text - DETX (24):

This operation subtracts the absolute value of the **pixel outside the dynamic range from the pixel in the neighborhood**. For bright **pixels, this process is reversed and the values of neighboring pixels** is adjusted upwards within the limits of the **dynamic range**. The net effect of this operation is that the local density is preserved and the number of pixels outside the valid dynamic range is reduced. For the example of Table 2b, the effect is shown in Table 3. A comparison of Tables 3a and 3b shows the reduction of the noise artifacts. The number of pixels outside the dynamic range is reduced dramatically (from 27 to 1) and the noise has strongly been suppressed. Table 4 shows the result after the final step of clipping all image values back into the permitted dynamic range. The reduction of the noise is obvious.

US-PAT-NO: 6392764

DOCUMENT-IDENTIFIER: US 6392764 B1

TITLE: Systems and methods for adaptively filtering palettized images

DATE-ISSUED: May 21, 2002

US-CL-CURRENT: 358/522, 382/162 , 382/168

APPL-NO: 09/ 189931

DATE FILED: November 12, 1998

---------- KWIC ---------

Detailed Description Text - DETX (12):

To enhance a palletized image stored in the palletized image data memory 282, the local image data analyzing circuit 240 selects a current pixel of the palletized image data and a number of neighboring pixels that are within a predefined neighborhood around the selected current pixel. The local image data analyzing circuit 240 determines a dynamic range for each of the color separation layers for the current pixel. In particular, the local image data analyzing circuit 240 can determine a single dynamic range for the current pixel. Alternatively, the local image data analyzing circuit 240 can separately determine an "up" dynamic range and a

"down" dynamic range for the current pixel. The single **dynamic range** is the largest absolute difference between the image value of the current **pixel and the largest or smallest image value of the neighboring pixels in the neighborhood around the current pixel**. In contrast, "up" **dynamic range** is the absolute difference between the image value of the current **pixel and the largest image value of the pixels in the predefined neighborhood around the current pixel**. Similarly, the "down" **dynamic range** is the absolute difference between the image value of the current **pixel and the smallest image value of the pixels in the predefined neighborhood around the current pixel**.

Detailed Description Text - DETX (31):

Once the global filter parameter generating circuit 230 has determined the values for the filter parameters .sigma..sub.MAX and .sigma..sub.COM, either by analyzing the explicitly contained color palette or by globally analyzing the palletized image, the local image analyzing circuit 240, under control of the controller 210, receives each pixel of the palletized image in order. For each pixel, the local image analyzing circuit 240 defines a neighborhood of pixels that are adjacent to and/or near the current pixel. The local image data analyzing circuit 240 then determines a **dynamic range** of each color separation layer for the **pixels forming the neighborhood around the selected pixel**. As

described above, this **dynamic range** is defined, for each color separation layer, by the maximum absolute difference between the image value of the current pixel and the image value of any image value of a **pixel in the predefined neighborhood**.

Detailed Description Text - DETX (32):

Alternatively, as described above, both "down" and "up" dynamic ranges can be defined. In particular, as described above, the "down" **dynamic range** is the absolute difference between the image value of the current **pixel and the lowest image value of the pixels in the predefined neighborhood**. The "up" **dynamic range** is the absolute difference between the image value of the current **pixel and the highest image value of the pixels in the predefined neighborhood**. Determining both "down" and "up" dynamic ranges is advantageous because it better preserves edge information.

Detailed Description Text - DETX (43):

In step S400, the global image filter parameters are determined by analyzing the color separation layer histograms generated in step S300. Then, in step S600, a first pixel of the image data is selected as a current pixel. Next, in step S700, neighboring pixels that neighbor the current pixel are identified. Then, in step S800, the single **dynamic range** D.sub.N is determined as the absolute difference of the image value of the current pixel with the image

value of any **pixel value in the predefined neighborhood**. Alternatively, as described above in step S800, separate up and down dynamic ranges D.sub.NU and D.sub.ND can be determined. Control then continues to step S900.

US-PAT-NO: 6438264

DOCUMENT-IDENTIFIER: US 6438264 B1

TITLE: Method for compensating image color when adjusting the contrast of a digital color image

DATE-ISSUED: August 20, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gallagher; Andrew C.	Rochester	NY	N/A	N/A
Gindele; Edward B.	Rochester	NY	N/A	N/A

APPL-NO: 09/ 224028

DATE FILED: December 31, 1998

US-CL-CURRENT: 382/167, 358/1.9 , 358/504 , 358/518 , 382/162

ABSTRACT:

A method of adjustment of the color saturation characteristics of a digital color image is performed in order to compensate for an applied luminance tone scale function. This method comprises of the steps of receiving a tone scale function, calculating a local slope of the tone scale function for each pixel of the digital color image, calculating a color saturation signal from the

digital color image, and adjusting the color saturation signal of the digital color image for each of the pixels based on the calculated local slope.

12 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 4

---------- KWIC ---------

Claims Text - CLTX (1):

1. A method for processing a digital color image having a plurality of pixels, the method comprising the steps of: (a) receiving a tone scale function; (b) calculating a local slope of the tone **scale** function for each **pixel of the digital color image based on a ratio calculation evaluated for each pixel**; (c) calculating a color saturation signal from the digital color image, and (d) adjusting the color saturation signal of the digital color image for each of the pixels based on the calculated local slope.

US-PAT-NO: 6192152

DOCUMENT-IDENTIFIER: US 6192152 B1
See image for Certificate of Correction

TITLE: Image processing apparatus

DATE-ISSUED: February 20, 2001

US-CL-CURRENT: 382/199, 358/466 , 382/263 , 382/264 , 382/266 , 382/269

APPL-NO: 08/ 064790

DATE FILED: May 21, 1993

PARENT-CASE:

This application is a continuation-in-part of application Ser. No. 07/561,097, filed Aug. 1, 1990.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	1-199369	August 2, 1989
JP	1-199370	August 2, 1989

---------- KWIC ---------

Drawing Description Text - DRTX (22):
FIG. 21 is a view for explaining a **color bleeding** state;

Detailed Description Text - DETX (107):

This processing is executed to remove **color bleeding at color** change points of an original caused by scanning speed nonuniformity of the scanning mirrors 206 to 208 and a magnification error of the focusing lens 209, which constitute the scanning optical system shown in FIG. 1.

Detailed Description Text - DETX (111):

In the circuit shown in FIG. 18, when an objective pixel is a black pixel, the black image analysis signal BL is output regardless of surrounding pixels. However, when the above-mentioned scanning speed nonuniformity or a focusing magnification error occurs, a black signal due to **color bleeding** may often be generated around a color signal, as shown in FIG. 21. Since the black signal due to **color bleeding is generated around the color** signal, its light amount value is larger than that of the color signal, as shown in FIG. 22.

Detailed Description Text - DETX (112):

FIG. 21 is a view for explaining a **color bleeding** state, and FIG. 22 is a graph for explaining light amount characteristics at a specific position in FIG. 21. In FIG. 22, a light amount is plotted along the ordinate, and a specific position is plotted along the abscissa.

Detailed Description Text - DETX (113):

As described above, when the black signal due to **color bleeding is generated around a color** signal, its light amount value is larger than that of the color signal, as shown in FIG. 22. Therefore, whether or not a color pixel signal COL having a smaller light amount value than that of an objective pixel is present around the objective pixel is detected to generate the cancel signal CAN.

Detailed Description Text - DETX (279):
The video signal VIDEO is converted into an analog video signal AV by a D/A converter 3701, and the analog signal is then input to comparators 3708 and 3709. The pixel clock CLK synchronous with the video signal VIDEO and a screen clock CLK4 having a frequency twice that of the clock CLK are frequency-divided with 1/2 by toggle flip-flops 3702 and 3703 in synchronism with the horizontal sync signal HSYNC to be converted into the pixel clock CLK and the screen clock CLK4 having a duty ratio of 50%. The pixel clock CLK and the screen clock CLK4 are converted to triangular waves by integrators 3704 and 3705 each comprising a resistor R and a capacitor C. The peaks of these triangular waves are adjusted to an output **dynamic range** of an A/D converter by amplifiers 3706 and 3707. The adjusted triangular waves are compared with the analog video signal AV by analog comparators 3708 and 3709, respectively. In this manner, the analog video signal AV is converted to two PWM signals PW4 and PW. Thereafter,

one of the PWM signals PW4 and PW is selected by a selector 3710 in accordance with the delayed screen control signal DSCR output from the delay memory 121.
The selected signal is input to a drive circuit of a laser unit (not shown) as a laser drive signal LDR.